

U.S. Patent Application Serial No. **10/073,895**
Amendment Under 37 C.F.R. §1.116 dated March 2, 2004
Response to the Final Rejection dated December 2, 2003

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (Canceled).

Claim 2 (Previously Presented): The longitudinal coupled multiple mode SAW filter according to claim 3, comprising

two reflectors disposed on both sides of a plurality of IDTs along the propagation direction of the surface wave, wherein

the reflectors reflect the surface wave and trap oscillation energy of the surface wave between them.

Claim 3 (Previously Presented): A longitudinal coupled multiple mode SAW filter, comprising a plurality of IDTs disposed along a propagation direction of a surface wave on a piezoelectric substrate, wherein

an IDT is flanked on either side by IDTs,

a comb electrode of the IDT in the middle is connected with an input terminal, the other comb electrode of the middle IDT is grounded,

a comb electrode of the IDT on each side of the middle IDT is connected with an output terminal, the other comb electrodes of the side IDTs are grounded,

U.S. Patent Application Serial No. 10/073,895
Amendment Under 37 C.F.R. §1.116 dated March 2, 2004
Response to the Final Rejection dated December 2, 2003

electrode fingers are so arranged that adjacent electrode fingers of the middle IDT and the IDT on one side make a connection between terminals or a connection between grounds and the other adjacent electrode fingers of the middle IDT and the IDT on the other side make a connection between a terminal and a ground, wherein

the width of adjacent electrode fingers of an input IDT and an output IDT is designed to be smaller than the width of the other electrode fingers.

Claim 4 (Previously Presented): The longitudinal coupled multiple mode SAW filter according to claim 3, wherein

the pitch between adjacent electrode fingers of the input IDT and the output IDT and electrode fingers next to the adjacent electrode fingers is designed to be narrower than the pitch between the other electrode fingers.

Claim 5 (Original): The longitudinal coupled multiple mode SAW filter according to claim 4, wherein the width of a plurality of adjacent electrode fingers of the input IDT and the output IDT is designed to be smaller than the width of the other electrode fingers.

Claim 6 (Previously Presented): The longitudinal coupled multiple mode SAW filter according to claim 3, wherein the output terminals are formed facing one direction.

U.S. Patent Application Serial No. 10/073,895
Amendment Under 37 C.F.R. §1.116 dated March 2, 2004
Response to the Final Rejection dated December 2, 2003

Claim 7 (Previously Presented): A longitudinal coupled multiple mode SAW filter comprising a plurality of IDTs disposed along a propagation direction of a surface wave on a piezoelectric substrate, wherein

an IDT is flanked on either side by IDTs,

a comb electrode of the IDT in the middle is connected with an input terminal, the other comb electrode of the middle IDT is grounded,

a comb electrode of the IDT on each side of the middle IDT is connected with an output terminal, the other comb electrodes of the side IDTs are grounded,

electrode fingers are so arranged that adjacent electrode fingers of the middle IDT and the IDT on one side make a connection between terminals or a connection between grounds and the other adjacent electrode fingers of the middle IDT and the IDT on the other side make a connection between a terminal and a ground, wherein

the grounds are established facing one direction.

Claim 8 (Previously Presented): A longitudinal coupled multiple mode SAW filter comprising a plurality of IDTs disposed along a propagation direction of a surface wave on a piezoelectric substrate, wherein

an IDT is flanked on either side by IDTs,

a comb electrode of the IDT in the middle is connected with an input terminal, the other comb electrode of the middle IDT is grounded,

U.S. Patent Application Serial No. 10/073,895
Amendment Under 37 C.F.R. §1.116 dated March 2, 2004
Response to the Final Rejection dated December 2, 2003

a comb electrode of the IDT on each side of the middle IDT is connected with an output terminal, the other comb electrodes of the side IDTs are grounded,

electrode fingers are so arranged that adjacent electrode fingers of the middle IDT and the IDT on one side make a connection between terminals or a connection between grounds and the other adjacent electrode fingers of the middle IDT and the IDT on the other side make a connection between a terminal and a ground, wherein

the output terminals are mutually formed in opposite directions.

Claim 9 (Canceled).

Claim 10 (Previously Presented): The SAW filter according to claim 13, wherein the longitudinal coupled multiple mode SAW filter comprises two reflectors disposed on both sides of a plurality of IDTs along the propagation direction of the surface wave, and the reflectors reflect the surface wave and trap oscillation energy of the surface wave between them.

Claim 11 (Previously Presented): The SAW filter according to claim 13, wherein the resonator is a one-port resonator.

U.S. Patent Application Serial No. 10/073,895
Amendment Under 37 C.F.R. §1.116 dated March 2, 2004
Response to the Final Rejection dated December 2, 2003

Claim 12 (Previously Presented): The SAW filter according to claim 13, wherein the resonator comprises two reflectors for reflecting the surface acoustic wave disposed on both sides of one or a plurality of IDTs along the propagation direction of the surface wave.

Claim 13 (Previously Presented): A SAW filter comprising a longitudinal coupled multiple mode SAW filter comprising a plurality of IDTs disposed along a propagation direction of a surface wave on a piezoelectric substrate and a resonator which includes one or a plurality of IDTs for exciting and receiving a surface acoustic wave, has antiresonant frequency approximately equivalent to cut-off frequency on the high-pass side of a pass-band of the longitudinal coupled multiple mode SAW filter and connects with the longitudinal coupled multiple mode SAW filter in series, the longitudinal coupled multiple SAW filter wherein

an IDT is flanked on either side by IDTs,

a comb electrode of the IDT in the middle is connected with an input terminal, the other comb electrode of the middle IDT is grounded,

a comb electrode of the IDT on each side of the middle IDT is connected with an output terminal, the other comb electrodes of the side IDTs are grounded,

electrode fingers are so arranged that adjacent electrode fingers of the middle IDT and the IDT on one side make a connection between terminals or a connection between grounds and the

other adjacent electrode fingers of the middle IDT and the IDT on the other side make a connection between a terminal and a ground, wherein

the width of adjacent electrode fingers of an input IDT and an output IDT in the longitudinal coupled multiple mode SAW filter is designed to be smaller than the width of the other electrode fingers.

Claim 14 (Previously Presented): The SAW filter according to claim 13, wherein

the pitch between adjacent electrode fingers of the input IDT and the output IDT and electrode fingers next to adjacent the electrode fingers is designed to be narrower than the pitch between the other electrode fingers.

Claim 15 (Original): The SAW filter according to claim 14, wherein the width of a plurality of adjacent electrode fingers of the input IDT and the output IDT is designed to be smaller than the width of the other electrode fingers.

Claim 16 (Previously Presented): The SAW filter according to claim 13, wherein

the output terminals are formed facing one direction.

Claim 17 (Previously Presented): A SAW filter comprising

a longitudinal coupled multiple mode SAW filter comprising a plurality of IDTs disposed along a propagation direction of a surface wave on a piezoelectric substrate and a resonator which includes one or a plurality of IDTs for exciting and receiving a surface acoustic wave, has antiresonant frequency approximately equivalent to cut-off frequency on the

high-pass side of a pass-band of the longitudinal coupled multiple mode SAW filter and connects with the longitudinal coupled multiple mode SAW filter in series, the longitudinal coupled multiple SAW filter wherein

an IDT is flanked on either side by IDTs,

a comb electrode of the IDT in the middle is connected with an input terminal, the other comb electrode of the middle IDT is grounded,

a comb electrode of the IDT on each side of the middle IDT is connected with an output terminal, the other comb electrodes of the side IDTs are grounded,

electrode fingers are so arranged that adjacent electrode fingers of the middle IDT and the IDT on one side make a connection between terminals or a connection between grounds and the other adjacent electrode fingers of the middle IDT and the IDT on the other side make a connection between a terminal and a ground, wherein

the grounds are established facing one direction.

Claim 18 (Previously Presented): A SAW filter comprising

a longitudinal coupled multiple mode SAW filter comprising a plurality of IDTs disposed along a propagation direction of a surface wave on a piezoelectric substrate and

a resonator which includes one or a plurality of IDTs for exciting and receiving a surface acoustic wave, has antiresonant frequency approximately equivalent to cut-off frequency on the high-pass side of a pass-band of the longitudinal coupled multiple mode SAW filter and connects with the longitudinal coupled multiple mode SAW filter in series, the longitudinal coupled multiple SAW filter wherein

an IDT is flanked on either side by IDTs,

a comb electrode of the IDT in the middle is connected with an input terminal, the other comb electrode of the middle IDT is grounded,

a comb electrode of the IDT on each side of the middle IDT is connected with an output terminal, the other comb electrodes of the side IDTs are grounded,

electrode fingers are so arranged that adjacent electrode fingers of the middle IDT and the IDT on one side make a connection between terminals or a connection between grounds and the other adjacent electrode fingers of the middle IDT and the IDT on the other side make a connection between a terminal and a ground, wherein

the output terminals are mutually formed in the opposite directions.

Claim 19 (Currently Amended): A longitudinal coupled multiple mode SAW filter comprising a plurality of IDTs disposed along a propagation direction of a surface wave on a piezoelectric substrate, wherein

an IDT is flanked on either side by IDTs,

a comb electrode of the IDT in the middle is connected with an input terminal,

a comb electrode of the IDT on each side of the middle IDT is connected with an output terminal,

only the width of adjacent electrode fingers of an input IDT and an output IDT is

designed to be smaller than the width of the other electrode fingers.

Claims 20 and 21(Canceled).